

## Technologies Providing New Solutions

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Oil and gas operations present several challenges to mobile computing hardware and software, ranging from the types and volumes of data, to the simple fact that mobile devices have to be able to tolerate extreme conditions. A shiny off-the-shelf commercial tablet probably would have a very limited life expectancy on a busy drilling rig or production site, and the mobile applications written for the typical consumer likely would be grossly inadequate for oil and gas, given the complex nature of the workflows.

However, the basic hardware and software components to make mobile and cloud computing a reality in exploration and production are rapidly coming to market, with new devices and application options available seemingly by the day. A case in point is a variety of purpose-engineered ruggedized tablets that are designed to withstand the elements present in even the world's harshest operating extremes, including Arctic climates and hazardous environments.

### High-Performance Cloud

"The massive computational and storage requirements in oil and gas industry applications make high-performance computing imperative," says Abhinav Chawade, high-performance computing engineer at AMAX, which provides computing and storage solutions.

However, he says the challenge is more complex than simply adding compute and storage capacity.

"Computing and storage resources must be optimized with parallelization, accelerated storage and reduced latency to achieve the best overall performance," Chawade says, citing an example related to the choice of

storage media. "Traditional drives have a latency of multiple milliseconds, but latency

can be reduced to sub millisecond with solid state drive technology."

Moving high-performance computing to the cloud enables virtualization on mobile devices. "The trends of high-performance computing and the cloud are marching together," Chawade holds. "The cloud is all about consolidation. High-performance computing is about high compute power and low latency. To get the best out of your resources, virtualization and high-performance computing will be the future."

Virtualization is a very attractive step toward the cloud, says Chawade. "There are two main advantages: You do not need to beef up a client, and you save money," he says, adding that virtualization is the foundation for the cloud, which he defines in three categories:

- Software as a service to provide software applications on demand;
- Platform as a service to provide access to computing resources and tools for developing and hosting the user's own applications; and
- Infrastructure as a service to allow consolidated access to resources such as storage and processing power.

Over the past several years, operating companies, geophysical contractors and service companies have made considerable investments in clustered systems of high-performance servers running Linux<sup>™</sup>. Chawade suggests that a logical start for cloud computing within these companies is to develop behind-the-firewall internal cloud environments to evaluate suitability of these applications to harness the full power of those clusters.

"Because there are so many CPUs connected in a cluster, there is often idle compute capacity at any given time, which is a waste of power and money," he remarks. "A cloud configuration could improve resource utilization by eliminating idle time."



Moving high-performance computing to the cloud enables virtualization on mobile devices. Virtualization is a foundation for cloud computing, encompassing software as a service to provide software applications on demand, platform as a service to provide access to computing resources and tools for developing and hosting the user's own applications, and infrastructure as a service to allow consolidated access to resources such as storage and processing power.